

This Page Is Inserted by IFW Operations  
and is not a part of the Official Record

## **BEST AVAILABLE IMAGES**

Defective images within this document are accurate representations of the original documents submitted by the applicant.

Defects in the images may include (but are not limited to):

- BLACK BORDERS
- TEXT CUT OFF AT TOP, BOTTOM OR SIDES
- FADED TEXT
- ILLEGIBLE TEXT
- SKEWED/SLANTED IMAGES
- COLORED PHOTOS
- BLACK OR VERY BLACK AND WHITE DARK PHOTOS
- GRAY SCALE DOCUMENTS

**IMAGES ARE BEST AVAILABLE COPY.**

**As rescanning documents *will not* correct images,  
please do not report the images to the  
Image Problem Mailbox.**

What is claimed is:

1. A printing system for performing printing operations for print data, comprising:

a network, a print controller connected to the network,  
5 a mail server connected to the network, and a plurality of client devices connected to the network, wherein:

each of the plurality of client devices includes a print data transmitter that transmits print data sets to the print controller;

10 the print controller includes:

a print data receiver for receiving the print data sets from the client devices;

a print data manager for designating  
correspondence between received print data sets and  
15 print management information that indicates conditions of printing operations for each of the received print data sets; and

a notification data preparer that prepares,  
based on the print management information,  
20 notification data to be notified to at least one client device, and that transmits the notification data to the mail server;

the mail server includes an electronic mail preparer  
that prepares the received notification data into an  
25 electronic mail message, and that transmits the electronic

mail message to the at least one client device; and

the at least one client device further includes an electronic mail receiver that receives the notification data in the electronic mail message from the mail server.

5           2. A printing system as claimed in claim 1, wherein the notification data preparer of the print controller transmits the notification data to the mail server each time the print controller receives print data from one of the client devices.

10           3. A printing system as claimed in claim 1, wherein the notification data preparer of the print controller transmits the notification data to the mail server each time the print data manager updates the management information.

15           4. A printing system as claimed in claim 1, wherein the notification data preparer of the print controller transmits the notification data to the mail server each time power of the print controller is turned on.

20           5. A printing system as claimed in claim 1, wherein the notification data preparer of the print controller divides the plurality of client devices into a predetermined number of groups, and prepares different notification data for each group.

25           6. A printing system as claimed in claim 5, wherein the predetermined plurality of groups includes a normal user group and a management group.

7. A print control method for controlling printing operations performed in a printing system that includes a network, a print controller connected to the network, a mail server connected to the network, and a plurality of client devices connected to the network, the print control method comprising the steps of:

transmitting print data sets from one of the client devices to the print controller;

receiving, at the print controller, the print data sets from the client devices;

designating, in the print controller, correspondence between the received print data sets and print management information that indicates conditions of printing operations for each of the plurality of received print data sets;

preparing, in the print controller, the notification data based on the print management information to be notified to at least one client device;

transmitting the notification data from the print controller to the mail server;

preparing, at the mail server, received notification data into an electronic mail message to the at least one client device; and

receiving, at the at least one client device, the notification data in the electronic mail message from the mail server.

8. A printing system for performing printing operations on a plurality of print data sets, the printing system comprising:

5 a reprint number setter that sets, for each print data set, a reprint number representing an upper limit of how many times reprinting operations are to be performed on each print data set, and that appends, as appended information, a corresponding reprint number to each of the plurality of print data sets;

10 a holder that holds the plurality of print data sets as targets of reprint processes;

a reprint controller that retrieves, from the holder, a print data set for which a reprint command is received and that controls reprint processes for the retrieved print data set; and  
15

a print data eraser that erases, from the holder, each print data set that the reprint controller has used for reprint processes for a number of times equaling the corresponding reprint number.

20 9. A system as claimed in claim 8, wherein the reprint number setter reduces the reprint number for a print data set each time the reprint controller uses the print data set for a reprint operation.

25 10. A system as claimed in claim 9, wherein the print data eraser erases a print data set from the holder when the

reprint number setter changes the reprint number for the print data set to zero.

11. A system as claimed in claim 9, further comprising a reprint number change preventor that prevents the reprint  
5 number setter from changing the reprint number set for each print data set.

12. A system as claimed in claim 8, further comprising:

a client device for preparing the print data sets; and  
10 a print controller for controlling printing processes performed for the print data sets, wherein

the client device includes:

the reprint number setter; and

a transmitter that transmits, to the print  
15 controller, print data and appended information including the reprint number; and

the print controller includes:

a receiver that receives, from the client  
device, print data and the appended information  
20 including the reprint number;

the holder;

the reprint controller; and

the print data eraser.

13. A program storage medium capable of being read by  
25 a computer in a printing system for performing printing

operations on a plurality of print data sets, the program comprising:

a program of setting, for each print data set, a reprint number representing an upper limit of how many times reprinting operations are performed on each print data set;

a program of appending, as appended information, a corresponding reprint number to each of the plurality of print data sets;

a program of holding the plurality of print data sets as targets of reprint processes;

a program of retrieving a held print data set for which a reprint command is received;

a program of controlling reprint processes for the retrieved print data set; and

a program of erasing each held print data set that has been used for reprint processes for a number of times equaling the corresponding reprint number.

14. A print controller comprising:

a reception unit that receives a plurality of print data sets for print jobs from a client device;

a storage unit that serially stores the print data in a spool region by print job;

a print data manager that associates the print data sets stored in the spool region with print management information that includes a predetermined condition;

a judgment unit that judges whether or not total data size of print data sets stored in the spool region exceeds a preset reference data size; and

5 a print data eraser that, when the judgment unit judges that the total data size exceeds the reference data size, selects a print data set according to the predetermined condition of the print management information associated with each print data set, and erases the selected print data set from the spool region.

10 15. A print controller as claimed in claim 14, wherein the judgment unit adds data size of each print data set stored in the spool region to calculate the total data size, and judges by comparing the total size with the reference data size.

15 16. A print controller as claimed in claim 14, wherein the judgment unit sets a reference data set number representing how many data sets are assumed to be required to match the reference data size, and judging whether the number of print data sets stored in the spool region exceeds  
20 the reference data set number.

17. A print controller as claimed in claim 14, wherein the print data manager associates the print data sets with spool time information in the print management information, the spool time information indicating spool time when each  
25 print data set was stored in the spool region, the print



data eraser selecting a print data set with an earliest spool time according to the spool time information and erasing the selected print data set.

18. A print controller as claimed in claim 14, wherein  
5 the print data manager associates the print data sets with last print time information in the print management information, the last print time information indicating print time when a print operation was last performed for each print data set, the print data eraser selecting a print  
10 data set with an earliest print time according to the last print time information and erasing the selected print data set.

19. A print controller as claimed in claim 14, wherein the print data manager associates the print data sets with  
15 erasable time information in the print management information, the erasable time information designating erase times after which corresponding print data sets can be erased, the print data eraser selecting a print data set with an exceeded erase time or with an earliest erase time  
20 and erasing the selected print data.

20. A printing system comprising:

a client device for handling a plurality of print data sets for print jobs;

a print controller connected to the client device,  
25 wherein:

the client device includes a print data transmission unit for transmitting the plurality of print data sets to the print controller; and

the print controller includes:

5           a reception unit that receives the plurality of print data sets from the client device;

          a storage unit that serially stores the print data in a spool region by print job;

10           a print data manager that associates the print data sets stored in the spool region with print management information that includes a predetermined condition;

15           a judgment unit that judges whether or not total data size of print data sets stored in the spool region exceeds a preset reference data size; and

20           a print data eraser that, when the judgment unit judges that the total data size exceeds the reference data size, selects a print data set according to the predetermined condition of the print management information associated with each print data set, and erases the selected print data set from the spool region.

25           21. A program storage medium capable of being read by a computer of a printing system that includes a client

device and a print controller, the client device handling a plurality of print data sets for print jobs, the print controller being connected to the client device and controlling print processes using the plurality of print data sets, the program comprising:

a program of transmitting, from the client device, the plurality of print data sets to the print controller;

a program of receiving, at the print controller, the plurality of print data sets from the client device;

a program of serially storing the received print data sets by print job in a spool region of the print controller;

a program of associating the print data sets stored in the spool region with print management information that includes a predetermined condition;

a program of judging whether or not total data size of print data sets stored in the spool region exceeds a preset reference data size;

a program of selecting a print data set according to the predetermined condition of the print management information associated with each print data set when the judgment unit judges that the total data size exceeds the reference data size; and

a program of erasing the selected print data set from the spool region.

22. A printing system comprising:

a network, a print controller connected to the network,  
and a printer connected to the network;

the print controller including:

5 a print-controller-side transceiver that  
transmits commands and data to and receives commands  
and data from the printer over the network; and

10 a print-controller-side controller that  
controls the print-controller-side transceiver to  
selectively transmit to the printer a storage command  
commanding the printer to store data, a retrieval  
command commanding the printer to retrieve and  
transmit stored data, and an update command  
commanding the printer to update stored data; and

the printer including:

15 a printer-side transceiver that transmits  
commands and data to and receives commands and data  
from the print controller over the network;

a storage unit that stores data; and

20 a printer-side controller that, upon receipt  
of a storage command, stores data in the storage unit,  
and, upon receipt of a retrieval command, controls  
the storage unit to retrieve data indicated by the  
retrieval command and controls the printer-side  
transceiver to transmit the retrieved data to the  
25 print controller;

the print controller further including an amender that amends data retrieved by and transmitted from the printer as a result of the retrieval command, the print-controller-side transceiver transmitting the amended data to the printer; wherein the printer-side controller, upon receipt of an update command, updates data stored in the storage unit based on the amended data from the print controller.

23. A printing system as claimed in claim 22, wherein the data stored in and retrieved from the storage unit includes print management information for managing print data.

24. A printing system as claimed in claims 22, wherein the print management information includes erase time data indicating a time to erase print data from the storage unit, the printer-side controller controlling the storage unit to erase print data at the time indicated by the erase time data.

25. A method of controlling a printing system including a network, a print controller connected to the network, and a printer connected to the network, the method comprising the steps of;

transmitting a storage command from the print controller to the printer;

storing data in a storage unit of the printer, upon receipt of a storage command at the printer;

transmitting a retrieval command from the print controller to the printer;

retrieving the data from the storage unit of the printer, upon receipt of the retrieval command at the  
5 printer;

transmitting the retrieved data from the printer to the print controller;

amending the data transmitted from the printer as a result of the retrieval command,

10 transmitting the amended data from the print controller to the printer;

transmitting an update command from the print controller to the printer; and

updating, upon receipt of an update command, the data  
15 in the storage unit of the printer, based on the amended data from the print controller.

26. A program storage medium capable of being read by a print controller of printing system including a network, the print controller connected to the network, and a printer  
20 connected to the network, the program comprising:

a program of transmitting a storage command to the printer, commanding the printer to store data in a storage unit of the printer;

a program of transmitting a retrieval command to the  
25 printer, commanding the printer to retrieve the data from

the storage unit and transmit the data to the print controller;

a program of amending data transmitted from the printer as a result of the retrieval command;

5 a program of transmitting the amended data to the printer; and

a program of transmitting an update command from the print controller to the printer, commanding the printer to, upon receipt of the update command, update the data in the storage unit of the printer, based on the amended data from the print controller.

10 27. A program storage medium capable of being read by a printer of printing system including a network, a print controller connected to the network, and the printer connected to the network, the program comprising:

15 a program of receiving a storage command from the print controller, and storing data in a storage unit accordingly;

20 a program of receiving a retrieval command from the print controller, retrieving the data from the storage unit accordingly, and transmitting the data to the print controller;

a program of receiving amended data from the print controller; and

25 a program of receiving an update command from the

print controller, and accordingly updating the data in the storage unit, based on the amended data from the print controller.